## #///6

## SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: Wild, Hanno; Hanko, Rudolf; Dorschug, Michael;

Horlein, Hans-Dietrich; Beunink, Jurgen;

Apeler, Heiner; Wehlmann, Hermann; and Sebald,

Walter

(ii) TITLE OF INVENTION: HIL-4 MUTANT PROTEINS USED AS

ANTAGONISTS OR PARTIAL AGONISTS OF

HUMAN INTERLEUKIN 4

(iii) NUMBER OF SEQUENCES: 20

(iv) CORRESPONDENCE ADDRESS:

- (A) ADDRESSEE: Sprung Kramer Schaefer & Briscoe
- (B) STREET: 660 White Plains Road
- (C) CITY: Tarrytown
- (D) STATE: New York
- (E) COUNTRY: USA
- (F) ZIP: 10591-5144
- (v) COMPUTER READABLE FORM:
  - (A) MEDIUM TYPE: Diskette, 3.50 inch, 1.4 Mb storage
  - (B) COMPUTER: Apple Macintosh
  - (C) OPERATING SYSTEM: System 7.5
  - (D) SOFTWARE: WordPerfect 3.5
- (vi) CURRENT APPLICATION DATA:
  - (A) APPLICATION NUMBER: 08/765,012
  - (B) FILING DATE: 19-DEC-1996
  - (C) CLASSIFICATION:
- (vii) PRIOR APPLICATION DATA:
  - (A) APPLICATION NUMBER: PCT/EP95/02358
  - (B) FILING DATE: 19-JUN-1995
- (vii) PRIOR APPLICATION DATA:
  - (A) APPLICATION NUMBER: DE 44 23 131
  - (B) FILING DATE: 01-JUL-1994
- (viii) ATTORNEY/AGENT INFORMATION:
  - (A) NAME: Kurt G. Briscoe
  - (B) REGISTRATION NUMBER: 33,141
  - (C) REFERENCE/DOCKET NUMBER: BAYER 9776-KGB
- (ix) TELECOMMUNICATION INFORMATION:
  - (A) TELEPHONE: (914) 332-1700
  - (B) TELEFAX: (914) 332-1844
  - (2) INFORMATION FOR SEQ ID NO: 1:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 16 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: no

+7,0290

9

	ANTI-SENSE: no ORIGINAL SOURCE: (C) INDIVIDUAL ISOLATE: synthetic	
(xi)	SEQUENCE DESCRIPTION: SEQ ID NO: 1:	
CATGO	CACAAG TGCGAT	16
(i)	<ul> <li>(2) INFORMATION FOR SEQ ID NO: 2:</li> <li>SEQUENCE CHARACTERISTICS:</li> <li>(A) LENGTH: 12 base pairs</li> <li>(B) TYPE: nucleic acid</li> <li>(C) STRANDEDNESS: single</li> </ul>	
	(D) TOPOLOGY: linear MOLECULE TYPE: cDNA ) HYPOTHETICAL: no	
	ANTI-SENSE: no	
(V1)	ORIGINAL SOURCE: (C) INDIVIDUAL ISOLATE: synthetic	
(xi)	SEQUENCE DESCRIPTION: SEQ ID NO: 2:	
ATCG	CACTTG TG	12
(i)	<ul> <li>(2) INFORMATION FOR SEQ ID NO: 3:</li> <li>SEQUENCE CHARACTERISTICS:</li> <li>(A) LENGTH: 21 base pairs</li> <li>(B) TYPE: nucleic acid</li> <li>(C) STRANDEDNESS: single</li> <li>(D) TOPOLOGY: linear</li> </ul>	
	MOLECULE TYPE: cDNA	
	) HYPOTHETICAL: no	
	ANTI-SENSE: no ORIGINAL SOURCE:	
( V _ /	(C) INDIVIDUAL ISOLATE: synthetic	
(xi)	SEQUENCE DESCRIPTION: SEQ ID NO: 3:	
GCCT	CCAAGG ACACAACTGA G	21
(i)	<ul> <li>(2) INFORMATION FOR SEQ ID NO: 4:</li> <li>SEQUENCE CHARACTERISTICS:</li> <li>(A) LENGTH: 24 base pairs</li> <li>(B) TYPE: nucleic acid</li> <li>(C) STRANDEDNESS: single</li> <li>(D) TOPOLOGY: linear</li> </ul>	
	MOLECULE TYPE: cDNA	
•	) HYPOTHETICAL: no	
•	ANTI-SENSE: no ORIGINAL SOURCE:	
( ^ 1 )	(C) INDIVIDUAL ISOLATE: synthetic	
(xi)	SEQUENCE DESCRIPTION: SEQ ID NO: 4:	



GTG	AAGG	AAG (	CCGA	CCAG	AG T	ACG						24
	SE( (A (B (C	QUENC ) Li ) T' ) S'	CE CI ENGTI YPE: TRANI	HARA(H: 3( nuc: DEDNI	ON FOCTER: 6 bas leic ESS: line	ISTIC se pacion acion	CS: airs d gle	D NO	: 5:			
(ii)					CDN							
	-		HETI(		no							
			ENSE		_							
(V1)			AL SO			70T 71	<b></b>		4. 2 .	_		
(xi)									netic NO:			
CTGO	GAGAG	CTG (	CCAT	GCC	CA C	AAGT(	GCGA'	r ato	CACC			36
	SE( (A (B (D	QUEN( ) L1 ) T(	CE CI ENGTI YPE: OPOL(	HARA( H: 1: ami: OGY:	ON FO	ISTIO mino cid ear	CS: aci	ds		6.		
(XI)	51	-QOET	NCE I	JESCI	KIPT.	ION:	SE	עד ל	NO:	o:		
Met	Ala	His 1	Lys	Cys	Asp	Ile 5	Thr	Leu	Gln	Glu		
Ile 10	Ile	Lys	Thr	Leu	Asn 15	Ser	Leu	Thr	Glu			
Gln 20	Lys	Thr	Leu	Cys	Thr 25	Glu	Leu	Thr	Val			
Thr 30	Asp	Ile	Phe	Ala	Ala 35	Ser	Lys	Asn	Thr			,
Thr 40	Glu	Asn	Glu	Thr	Phe 45	Cys	Ärg	Ala	Ala			
Thr 50	Val	Leu	Arg	Gln	Phe 55	Tyr	Ser	His	His			
Glu 60	Lys	Asp	Thr	Arg	Cys 65	Leu	Gly	Ala	Thr			
Ala 70	Gln	Gln	Phe	His	Arg 75	His	Lys	Gln	Leu			

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 7:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 131 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Asp Ser Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 8:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 131 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu 10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu
70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80



Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 9:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 131 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu

1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Ġlu 10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80



Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Arg Glu Lys Asp Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 10:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 131 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90



Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Tyr Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 11:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 130 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Met His Lys Cys Asp Ile Thr Leu Gln Glu 1

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu 10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 12:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 130 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu 100 105 Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Asp Ser Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 13:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 130 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu 100 105 Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 14:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 130 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu 100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110 Met Arg Glu Lys Asp Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 15:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 130 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110 115



Met Asp Glu Lys Tyr Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 16:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 129 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser 120

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(2) INFORMATION FOR SEQ ID NO: 18: (i) SEQUENCE CHARACTERISTICS: LENGTH: 129 amino acids (B) TYPE: amino acid TOPOLOGY: linear (D) (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18: His Lys Cys Asp Ile Thr Leu Gln Glu 1 Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu 10 15 Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25 Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30 35 Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40 45 Thr Val Leu Arg Gln Phe Tyr Ser His His 50 55 Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60 65 Ala Gln Gln Phe His Arg His Lys Gln Leu 70 75 Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80 Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90 95

(2) INFORMATION FOR SEQ ID NO: 19:

SEQUENCE CHARACTERISTICS:

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser

105

115

125

100

110

120

(i)



(2) INFORMATION FOR SEQ ID NO: 17: (i) SEQUENCE CHARACTERISTICS:											
(A) LENGTH: 129 amino acids											
(B) TYPE: amino acid (D) TOPOLOGY: linear											
(xi)	SI	EQUE	ICE I	DESC	RIPT	ON:	SEÇ	QI Q	NO:	17:	
His 1	Lys	Cys	Asp	Ile 5	Thr	Leu	Gln	Glu			
Ile 10	Ile	Lys	Thr	Leu	Asn 15	Ser	Leu	Thr	Glu		
Gln 20	Lys	Thr	Leu	Cys	Thr 25	Glu	Leu	Thr	Val		
Thr 30	Asp	Ile	Phe	Ala	Ala 35	Ser	Lys	Asn	Thr		
Thr 40	Glu	Asn	Glu	Thr	Phe 45	Cys	Arg	Ala	Ala		
Thr 50	Val	Leu	Arg	Gln	Phe 55	Tyr	Ser	His	His		
Glu 60	Lys	Asp	Thr	Arg	Cys 65	Leu	Gly	Ala	Thr		
Ala 70	Gln	Gln	Phe	His	Arg 75	His	Lys	Gln	Leu		
Ile 80	Arg	Phe	Leu	Lys	Arg 85	Leu	Asp	Arg	Asn		
Leu 90	Trp	Gly	Leu	Ala	Gly 95	Leu	Asn	Ser	Cys		
Pro 100	Val	Lys	Glu	Ala	Asn 105	Gln	Ser	Thr	Leu		
Glu 110	Asn	Phe	Leu	Glu	Arg 115	Leu	Lys	Thr	Ile		
Met 120	Asp	Glu	Lys	Asp	Ser 125	Lys	Cys	Ser	Ser		



- (A) LENGTH: 129 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu 10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Arg Glu Lys Asp Asp Lys Cys Ser Ser 120

- (2) INFORMATION FOR SEQ ID NO: 20:
- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 129 amino acids
  - (B) TYPE: amino acid

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(D) TOPOLOGY: linear (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

His Lys Cys Asp Ile Thr Leu Gln Glu 1

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu 10

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val 20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr 30

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala 40

Thr Val Leu Arg Gln Phe Tyr Ser His His 50

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr 60

Ala Gln Gln Phe His Arg His Lys Gln Leu 70

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn 80

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys 90

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu 100

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile 110

Met Asp Glu Lys Tyr Asp Lys Cys Ser Ser 120